QUALITY ASSURANCE SAMPLING PLAN

FOR
SOIL SAMPLING
HURRICANE HARVEY RESPONSE SUPPORT
IMPACTED AREAS ALONG THE TEXAS AND LOUISIANA GULF COAST

Prepared for

U.S. Environmental Protection Agency Region 6
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1. INTRODUCTION

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START-4) contractor, has been tasked by the U.S. Environmental Protection Agency (EPA) Region 6 Emergency Response Branch (ERB) under Contract Number EP-S5-17-02, Technical Direction Document (TDD) No. TBD (Appendix E) to perform soil sampling activities at locations impacted by Hurricane Harvey. START-4 has prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed at the as part of the Emergency Response.

1.1 PROJECT OBJECTIVES

The objective is to determine the nature and type of contaminants in soils in areas where flood waters have receded and where recovered containers will be staged prior to disposal. Soil samples will be analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), total analyte list (TAL) metals, total petroleum hydrocarbons (TPHs), and percent moisture. This information will be used to help assess the presence of hazardous substances in soil and the potential for exposure to contaminants in soil.

The objective will be achieved by collecting soil samples from areas in locations of south Texas and Louisiana where flood waters from Hurricane Harvey have receded. Samples will be collected prior to the staging, Hazard Categorization Field Screening (HAZCAT®), and bulking of drummed waste, and other additional samples will be collected after these activities.

1.2 PROJECT TEAM

The Project Team will consist of TBD; TBD, as the START-4 Project Team Leader (PTL); TBD, as the Site Health and Safety Coordinator (SHSC); and additional START-4 personnel as necessary. Sampling locations will be determined in the field and in coordination with the EPA OSC. The sampling may be conducted by several field teams as needed. Each field team will coordinate with OSC in determining the location for sample collection in the field, collecting

samples as necessary, logging the activities at each sample location in the field logbook, verifying the sample documentation, and utilizing SCRIBE software.

1.3 QASP FORMAT

This QASP has been organized in a format that is intended to facilitate and effectively meet the project objectives. The QASP is organized in the following sections:

- Section 1 - Introduction
- Section 2 - Site Background
- Section 3 - Sampling Approach and Procedures
- Section 4 - Analytical Approach
- Section 5 - Quality Assurance

Appendices are attached with the following information:

- A Soil Data Quality Objective
- B Standard Operating Procedures
- C Incident Specific Risk-Based Screening Levels
- D Copy of TDD and Amendments

2. SITE BACKGROUND

On 25 August 2017, Hurricane Harvey made first landfall in the United States on the south Texas coast, returned to the Gulf of Mexico on 29 August 2017 and then on made second landfall on 30 August 2017 on the southwestern coast of Louisiana. Hurricane Harvey caused massive damage and flooding to broad areas of Texas and Louisiana.

2.1 SITE LOCATION AND DESCRIPTION

The locations, selected for collecting samples, are areas of south Texas and Louisiana where Hurricane Harvey flood waters have receded. The following Texas counties potentially could be sampled include: Nueces, San Patricio, Refugio, Calhoun, Jackson, Matagorda, Wharton, Brazoria, Fort Bend, Harris, Galveston, Liberty, Chambers, Jefferson and Orange. The Louisiana Parishes to be sampled will be determined if necessary.

2.2 SITE CONCERNS

The primary concern being addressed by this QASP is to screen for unacceptable risk from hazardous substances, which are hazardous to human health and the environment, in areas where flood waters have receded and where orphaned drums will be staged.

3. SAMPLING APPROACH AND PROCEDURES

Samples collected by EPA Region 6 will be used to evaluate the risks of hazardous materials present.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

The EPA OSC and designated sampling personnel will determine appropriate sample locations. EPA will use SCRIBE software to manage sample data in an electronic format. Add reference to Regional Data Management Plan.

3.1.1 Health and Safety Plan Implementation

Health and Safety operations will be conducted consistent with activities and responsibilities of the Incident Command System (ICS). All field activities will be conducted in accordance with a site-specific health and safety plan (HASP). The Field Safety Officer (FSO) will be responsible for implementation of the HASP during all field investigation activities. All EPA contractors and subcontractors will be required to conduct their activities according to the guidelines and requirements of the HASP.

3.1.2 Community Relations

Community relations may require additional EPA involvement due to the general nature of the site. It is anticipated that the EPA OSC will be available at all times, and community relations issues will be directed to the EPA OSC. If the EPA OSC is not present, the sampling personnel will manage community relations in the field as directed by the EPA OSC in conjunction with the Public Information Office (PIO) and Joint Information Center (JIC).

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3.2 SAMPLING/MONITORING APPROACH

All samples will be collected in accordance with the U.S. EPA Environmental Response Team standard operating procedure 2012 (Appendix B). The specific sampling procedures are described below.

3.2.1 Sampling

The samples will be distributed throughout the sampling area at locations determined by field personnel (GPS coordinates of samples will be documented).

All samples will be grab samples collected from the surface by scraping the surface with the appropriate sampling device. The sample will be placed immediately into appropriate sample containers.

The EPA OSC and the Environmental Unit will be notified, and concurrence will be obtained, should significant deviations from the planned sampling scheme be necessary. Details regarding deviations of the QASP will be documented in the site logbook.

The samples will be delivered to a National Environmental Laboratory Accreditation Conference (NELAC) certified laboratory to be specified prior to sample collection. VOCs, SVOCs, TAL metals, pesticides, herbicides, and PCBs, will be conducted utilizing EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* and TPH analyses will be conducted *Texas Commission on Environmental Quality (TCEQ) Method 1005*.

3.2.2 Sampling and Sample Handling Procedures

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objective. The volume of the sample collected must be sufficient to perform the laboratory analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate to the analysis to be performed.

All clean, decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area (add reference to the SOP). All samples will be collected with clean decontaminated equipment. All samples collected for laboratory analysis will be placed directly

into pre-cleaned, unused glass or plastic containers as appropriate based on the particular analytical method. Sampling personnel will change gloves between each sample collection/handling. All samples will be assembled and catalogued prior to shipping to the designated laboratory.

3.3 SOIL SAMPLING

START-4 will collect soil samples (plus all appropriate quality assurance samples) as part of the emergency response task to document the type of contaminants in areas where flood waters have receded and orphaned drums are staged. Quality assurance samples will be collected at the frequency of one co-located (duplicate) sample for every ten field samples. Co-located samples will be collected concurrently from particular sample locations.

3.4 SAMPLE MANAGEMENT

Specific nomenclature that will be used by WESTON will provide a consistent means of facilitating the sampling and overall data management for the project (Appendix B, SOP 0110.04). The WESTON Deputy Program Manager must approve any deviations from the sample nomenclature proposed below.

As stated in SOP 0110.04, sample nomenclature will follow a general format regardless of the type or location of the sample collected. The general nomenclature consists of the following components:

- Geographic location.
- Collection type (grab).
- QA/QC type (normal, duplicate, etc.).
- Sequence - An additional parameter used to further differentiate samples.

Sample data management will be completed utilizing the EPA Environmental Response Team (ERT) - provided Scribe software.

3.5 SAMPLE EQUIPEMENT DECONTAMINATION

The nondisposable sampling equipment used during the sample collection process will be thoroughly pre-cleaned before initial use, between use, and at the end of the field investigation (add reference to the SOP). Equipment decontamination will be completed in the following steps:

- High-pressure water spray or brush, if needed.
- Non-phosphate detergent and potable water wash to clean the equipment.
- Final potable water rinse.
- Equipment air-dried.

Personnel decontamination procedures will be described in the site-specific HASP that will be prepared by WESTON prior to implementation of activities at the site.

3.6 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Once collected, samples will be stored on ice at 4 degrees Celsius in coolers while at the site and until submitted for laboratory analysis. The samples will be sent by common carrier to the laboratory or driven by the WESTON START-4 members. See the holding times in Table 4-1 below.

WESTON will receive analytical results based on discussions with the EPA OSC. This turnaround time is initiated when the samples are collected in the field and continues until the analytical results are made available to WESTON either verbally or by providing facsimile or email copies of the results for review. Samples that have been analyzed will be disposed by the designated laboratory in accordance with the laboratory SOPs.

4. ANALYTICAL APPROACH

Samples collected by EPA during the sampling task will be delivered to EPA-designated laboratories for TPH utilizing *TCEQ Method 1005* and VOCs, SVOCs, TAL metals, pesticides, herbicides, PCBs, utilizing EPA publication SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* In determining the nature and extent of potential contamination, analytical results (on a dry weight basis) will be compared the Regional Removal Management Levels for Chemicals (RMLs) for soil (https://www.epa.gov/risk/regional-removal-management-levels-chemicals-rmls) in addition to site-specific background levels as determined by the Environmental Unit. Additionally, the analytical results will be compared to background. The Regional Removal Management Levels for Chemicals (RMLs) for soil are provided as Appendix C. Table 4-1 below provides requirements for containers, preservation techniques, sample volumes, and holding times.

TABLE 4-1

REQUIREMENTS FOR CONTAINERS, PRESERVATION TECHNIQUES, SAMPLE VOLUMES, AND HOLDING TIMES

Bottle	Parameter Category	Collected By	Container	Preservation	Minimum Sample Volume or Weight	Maximum Holding Time	Analytical Methods	Laboratory
Hg	Mercury	EPA	4 oz. wide-mouth glass jar	4°C	Fill to capacity	28 days	SW7471A	TBD
Non-Hg Metals	TAL Metals	EPA	4 oz. wide-mouth glass jar	4°C	Fill to capacity	180 days	SW6010B	TBD
EPA	Volatile Organic Compounds (VOCs)	EPA	5035/closed system using open-bore syringe and 3 – pre-weighted 40ml VOA vials w/stir-rods	4°C	5 g each vial	48 hours or 14 days if frozen at <-7º C	SW8260B	TBD
EPA	Semi-Volatile Compounds (SVOCs)	EPA	8 oz. wide-mouth glass jar with Teflon cap liner	4°C	Fill to capacity	14 days	SW8270C	TBD
EPA	Pesticides	EPA	8 oz. wide-mouth glass jar – one jar can be used for both Pest and PCBs with Teflon cap liner	4°C	Fill to capacity	14 days	SW8081B	TBD

TABLE 4-1 (CONTINUED)

REQUIREMENTS FOR CONTAINERS, PRESERVATION TECHNIQUES, SAMPLE VOLUMES, AND HOLDING TIMES

Bottle	Parameter Category	Collected By	Container	Preservation	Minimum Sample Volume or Weight	Maximum Holding Time	Analytical Methods	Laboratory
EPA	PCBs	EPA	8 oz. wide-mouth glass jar – one jar can be used for both Pest and PCBs with Teflon cap liner	4°C	Fill to capacity	14 days	SW8082B	TBD
EPA	Herbicides	EPA	8 oz. wide-mouth glass jar with Teflon cap liner	4°C	Fill to capacity	14 days	SW8151A	TBD
EPA	TPH	EPA	5035/closed system using open-bore syringe and 3 – pre-weighted 40ml VOA vials w/stir-rods	4°C	10 g each vial	48 hours or 14 days if frozen at <-7º C	TCEQ Method 1005	TBD
	% Moisture	N/A	Each Sample				ASTM D2216	

5. QUALITY ASSURANCE

Quality assurance will be conducted in accordance with the WESTON Quality Assurance Project Plan (QAPP) and the site-specific quality assurance information included in Appendix A.

5.1 QUALITY ASSURANCE SAMPLES

START-4 will prepare equipment rinsate blank samples as needed during the emergency response sampling activities. Quality assurance/quality control (QA/QC) samples will be collected according to the following:

- **Equipment rinsate blanks** will be prepared by pouring laboratory grade deionized water over nondisposable sampling equipment after it has been decontaminated and collecting the rinse water in sample containers for analyses. These samples will be prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed effectively. The equipment rinsate blanks will be prepared each day that nondisposable sampling equipment is used. It is estimated that one equipment rinsate samples will be collected during daily sampling activities.

- **Field blanks** will be collected when VOC samples are taken and are analyzed only for VOC analytes. The field blank consists of American Society of Testing and Materials (ASTM) Type II reagent grade water poured into a VOC sample vial at the sampling site. It is handled like an environmental sample and transported to the laboratory for analysis. Field blanks are used to assess the potential introduction of contaminants from ambient sources (e.g., gasoline motors in operation, etc.) to the samples during sample collection. Field blanks shall be collected and submitted once per day that VOC samples are collected.

- Laboratory prepared **trip blanks** will be submitted with each shipment containing samples for VOC analysis. The laboratory prepared trip blanks will consist of two 40-milliliter glass sample containers with Teflon lined septum caps. The trip blanks will be prepared with deionized water prior to leaving the laboratory. Trip blanks are used to evaluate the potential cross-contamination that may occur during the shipment of

samples.

- **Temperature blanks** will be prepared in the field and will consist of one 40-milliliter glass sample container with Teflon lined septum cap. The temperature blank will be packaged along with the field samples in the shipping cooler and will represent the temperature of the incoming cooler upon receipt at the laboratory. Use of these samples within a shipping container enables the laboratory to assess the temperature of the shipment without disturbing any of the field samples.
- One duplicate will be collected for every 10 samples.

5.2 DATA VALIDATION

Data validation is an analyte- and sample-specific process that extends the evaluation of data beyond method, procedural, or contractual compliance (i.e., data verification) to determine the analytical quality of a specific data set.

Data Validation of Field Activities will include the following:

- Evaluation of the field records for consistency.
- Review of QC information.
- Summarization of any deviations and determine impact on data quality.
- Summarization of samples collected.
- Preparation of field data validation report.

Data Validation of Analytical Laboratory Activities will include the following:

- Assemble planning documents and data to be validated. Review data verification records to determine method, procedural, and contractual required QC compliance/non-compliance.
- Review verified, reported sample results collectively for the data set as a whole, including laboratory qualifiers.

- Summarize data and QC deficiencies and evaluate the impact on overall data quality.
- Assign data validation qualifiers as necessary.
- Preparation of analytical data validation report.

5.3 SAMPLE CHAIN-OF-CUSTODY PROCEDURES

START-4 will utilize Scribe desktop and Scribe Enterprise for all sample documentation and chain-of-custody (COC) preparation needs. After sample collection and identification, the samples will be maintained under the COC procedures. If the sample collected is to be split with a third party, the sample will be allocated into similar sample containers. Sample labels completed with the same information, as that on the original sample container, will be attached to each of the split samples. All personnel required to package and ship coolers containing potentially hazardous material will be trained accordingly.

The COC procedures are documented in SOP 1101.01, Appendix A, and will be made available to all personnel involved with the sampling. A typical COC record included in SOP 1101.01 will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each of the sample labels and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and the member of the sampling team who originally relinquished the samples will retain another copy. START-4 personnel will complete a COC form for all samples sent to a START-4 designated off-site laboratory.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- The COC record will accompany samples. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.

- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and stuck to the seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.

- If sent by common carrier, a bill of lading or airbill will be used. Bill of lading and airbill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

SOPs 1101.01 and 1102.01, provided in Appendix A, describe these procedures in more detail.

5.4 PROJECT DOCUMENTATION

Field Documentation

START-4 will perform field documentation of site activities during all fieldwork. The primary methods of documentation will be completion of a field logbook and production of photographic documentation. All documents will be completed legibly and in ink. Any corrections or revisions will be made by lining through the original entry and initialing the change. The following field documentation will be maintained.

Locational Data

Latitude/longitude ("lat/long") coordinates will be collected and documented with environmental related data samples. This is in addition to, and not precluding, other critical location identification data that may be needed to satisfy individual program or project needs, such as depth, street address, elevation or altitude.

1. A goal of 25 meter level of accuracy will be achieved; managers of individual data collection efforts will determine the exact levels of precision and accuracy necessary to support their mission within the context of this goal. Global positioning systems (GPS) will be used obtain lat/longs of the highest possible accuracy.

2. Program data managers must collect and document the following information:

    - Latitude/longitude coordinates in accordance with federal Interagency Coordinating Committee for digital Cartography (FICCDC) recommendations. The coordinates may be present singly or multiple times, to define a point, line, or area, according to the most appropriate data type for the entity being represented. The format for representing this information is Decimal Degrees:

        +/-DD.DDDDD (latitude)

        +/-DDD.DDDDD (longitude)

        where:

        - Latitude is always presented before longitude
        - DD represents degrees of latitude; a two-digit decimal number ranging from 00 through 90
        - DDD represents degrees of longitude; a three-digit decimal number ranging from 000 through 180.
        - Five decimal places follow the degrees of latitude and longitude
        - + specifies latitudes north of the equator and longitudes east of the prime meridian
        - - specifies latitudes south of the equator and longitudes west of the prime meridian

3. Specified method used to determine the lat/long coordinates (e.g., remote sensing techniques, map interpolation, cadastral survey)

4. Textual description of the entity to which the latitude/longitude coordinates refer (e.g., north-east corner of site, entrance to facility, point of discharge, drainage ditch).

5. Estimate of accuracy in terms of the most precise units of measurement used (e.g., if the coordinates are given to tenths-of-seconds precision, the accuracy estimate should be

expressed in terms of the range of tenths-of-seconds within which the true value should fall, such as "+/-0.5 seconds").

6. Recommended labeling of the above information is as follows:

    - "Latitude"
    - "Longitude"
    - "Method"
    - "Description"
    - "Accuracy"

Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. The individuals making them will sign all entries. Entries should include, at a minimum, the following:

- Site name and project number.
- Names of personnel on-site.
- Dates and times of all entries.
- Descriptions of all site activities, including site entry and exit times.
- Noteworthy events and discussions.
- Weather conditions.
- Site observations.
- Identification and description of samples and locations, including GPS coordinates (latitude and longitude).
- Subcontractor information and names of on-site personnel.
- Dates and times of sample collections and COC information.
- Records of photographs.

- Site sketches.

Sample Labels

Sample labels will be securely affixed to the sample container. They will clearly identify the particular sample and should include the following information:

- Site name and project number.
- Date and time the sample was collected.
- Sample preservation method.
- Analysis requested.
- Sampling location.

COC Record

A COC record will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed, and each individual who has signed it will keep a copy of the record. The COC is discussed in Subsection 5.2, Sample Chain-of-Custody Procedures.

Custody Seal

Custody seals demonstrate that a sample container has not been opened or tampered. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

Photographic Documentation

Photographic documentation will be used by EPA/Contractor to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define site-related contamination or special working conditions. Representative photographs should be obtained of phase of site activity. The photographs should show typical operations and operating conditions as well as special situations and conditions that

may arise during site activities. Site final conditions should also be documented by photograph as a record of how the site appeared at completion of the work.

All photographs will be date-stamped and should be provided by using a film camera, a digital camera, or a video camera capable of recording the date on the image. Details of each photograph should be recorded in the logbook with the location of the photographer (including GPS coordinates), direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject should also be shown on a site sketch.

APPENDICES

APPENDIX A

SOIL DATA QUALITY OBJECTIVE

DATA QUALITY OBJECTIVE NO. 1
HURRICANE HARVEY
MEDIA OF CONCERN: Soil

STEP 1. STATE THE PROBLEM	
Soil samples will be collected from areas where flood waters from Hurricane Harvey have receded and orphaned drums staged to screen for the presence of hazardous waste (potential contaminants of concern) that could present an unacceptable risk to human health and the environment.	
STEP 2. IDENTIFY THE DECISION	
Are there potential chemicals of concern in soil, represented by a sample, based on comparison to residential screening benchmarks?	
IDENTIFY THE ALTERNATIVE ACTIONS THAT MAY BE TAKEN BASED ON THE DECISIONS.	• If any contaminant exceeds the specified benchmark in the soil, the soil will need for further characterization (unless the area is near the vicinity of a known chemical storage area). • If no contaminants exceed the specified benchmarks in soil, no further screening will be necessary for contaminants being analyzed.
STEP 3. IDENTIFY INPUTS TO THE DECISION	
IDENTIFY THE INFORMATIONAL INPUTS NEEDED TO RESOLVE A DECISION.	Contaminant concentrations in soil samples collected from where Hurricane Harvey flood waters have receded and orphaned drums staged.
IDENTIFY THE SOURCES FOR EACH INFORMATIONAL INPUT AND LIST THE INPUTS THAT ARE OBTAINED THROUGH ENVIRONMENTAL MEASUREMENTS.	• Soil samples from where Hurricane Harvey flood waters have receded and orphaned drums staged. • Analytical results from VOC, SVOC, pesticides, herbicides, metals, PCBs and TPH.
BASIS FOR THE CONTAMINANT SPECIFIC ACTION LEVELS.	For soil, Incident Specific Risk-Based Screening Levels (unless constrained by limits of detection).
IDENTIFY POTENTIAL SAMPLING TECHNIQUES AND APPROPRIATE ANALYTICAL METHODS.	• Grab samples of soil. • Locations to be determined in the field. • See Table 4-1 QASP

DATA QUALITY OBJECTIVE NO. 1
HURRICANE HARVEY
MEDIA OF CONCERN: Soil (Cont'd)

STEP 4. DEFINE THE BOUNDARIES OF THE STUDY	
DEFINE THE DOMAIN OR GEOGRAPHIC AREA WITHIN WHICH ALL DECISIONS MUST APPLY.	Location within south Texas and Louisiana as determined by EPA where orphaned drums are to be staged
SPECIFY THE CHARACTERISTICS THAT DEFINE THE POPULATION OF INTEREST.	Contaminant concentrations in soil at the sample locations.
DEFINE THE SCALE OF DECISION MAKING.	The scale of decision will be for the site activities occurring at the time of the sample collection.
DETERMINE THE TIME FRAME TO WHICH THE DATA APPLY.	The analytical data will apply until such a time as additional sampling activities are conducted and/or response actions taken.
DETERMINE WHEN TO COLLECT DATA.	Samples will be collected during the field sampling activities.
IDENTIFY PRACTICAL CONSTRAINTS ON DATA COLLECTION.	Inclement weather.
STEP 5. DEVELOP A DECISION RULE	
SPECIFY THE PARAMETER THAT CHARACTERIZES THE POPULATION OF INTEREST.	The concentrations of chemicals identified in soil samples.
SPECIFY THE ACTION LEVEL FOR THE DECISION.	For soil, Regional Removal Management Levels for Chemicals (RMLs) (unless constrained by detection limits).
DEVELOP A DECISION RULE.	If any result in a soil sample is above the contaminant specific screening level, then further characterization may be necessary (which would be addressed by a QASP for a future phase).

DATA QUALITY OBJECTIVE NO. 1
HURRICANE HARVEY
MEDIA OF CONCERN: Soil (Cont'd)

STEP 6. SPECIFY LIMITS ON DECISION ERRORS	
DETERMINE THE POSSIBLE RANGE OF THE PARAMETER OF INTEREST.	Contaminant concentrations may range from non–detect to above the screening values for soil.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	Type I Error: Deciding that the specified area represented by the soil sample does not exceed the specified screening level when, in truth, the soil concentration of the contaminant exceeds its screening level. The consequence of this decision error is that contaminated soil exists in a neighborhood, possibly endangering human health and the environment. This decision error is more severe.
DEFINE BOTH TYPES OF DECISION ERRORS AND IDENTIFY THE POTENTIAL CONSEQUENCES OF EACH.	Type II Error: Deciding that the specified area represented by the soil sample does exceed screening level when, in truth, it does not. The consequence of this decision error is that further characterization would take place, thereby, delaying the time when residents may return.
ESTABLISH THE TRUE STATE OF NATURE FOR EACH DECISION RULE.	The true state of nature when the soils are decided to be below the screening levels when in fact, they are not below the screening levels, is that further characterization may be necessary. The true state of nature when the soils are decided to be above the screening levels when in fact, they are not above the specified action levels, is that further characterization may not be necessary.
DEFINE THE TRUE STATE OF NATURE FOR THE MORE SEVERE DECISION ERROR AS THE BASELINE CONDITION OR THE NULL HYPOTHESIS (H_o) AND DEFINE THE TRUE STATE FOR THE LESS SEVERE DECISION ERROR AS THE ALTERNATIVE HYPOTHESIS (H_a).	H_o: The soils represented by the sample are above the screening level. H_a: The soils represented by the sample are below the screening level.

DATA QUALITY OBJECTIVE NO. 1
HURRICANE HARVEY
MEDIA OF CONCERN: Soil (Cont'd)

ASSIGN THE TERMS "FALSE POSITIVE" AND "FALSE NEGATIVE" TO THE PROPER DECISION ERRORS.	• False Positive Error = Type I • False Negative Error = Type II
ASSIGN PROBABILITY VALUES TO POINTS ABOVE AND BELOW THE ACTION LEVEL THAT REFLECT THE ACCEPTABLE PROBABILITY FOR THE OCCURRENCES OF DECISION ERRORS.	The assignment of probability values is not applicable to this DQO because these samples are being collected for baseline and screening purposes.

STEP 7. OPTIMIZE THE DESIGN	
REVIEW THE DQOs.	Review results of this screening level sampling event(s) to determine if modification of this DQO is necessary and/or determine what other steps may be necessary.